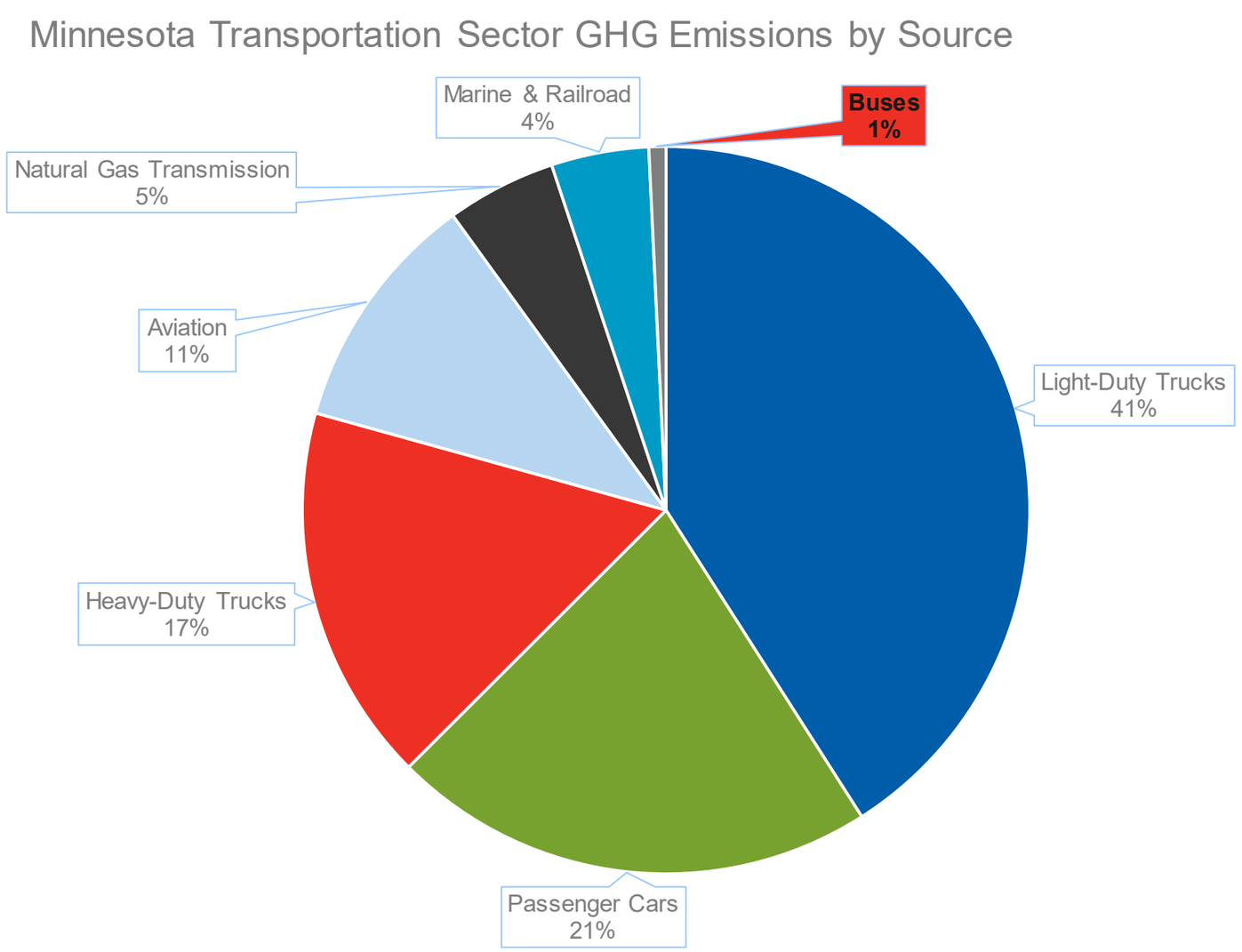
Zero Emission Bus Transition Plan

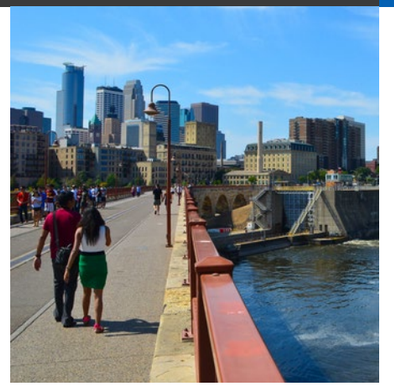
Metropolitan Transportation Services and Suburban Providers

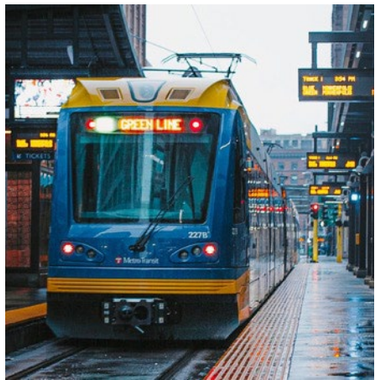
METROPOLITAN COUNCIL

Transportation Committee April 24, 2023

Minnesota Transportation Emissions







Guiding Principles

Scalability

Develop zero-emission deployment models tailored to unique service/fleet types, facility ownership status, and limited duration transit operating contracts

Technical Viability

Strive to achieve a level of service where ZEBs and diesel/gas buses are referred to as just "buses" rather than by their propulsion type

Technical Viability

Partner with electric utilities to assess and upgrade electrical infrastructure for bus operation and maintenance facilities

Equity & Environmental Justice

Implement and prioritize ZEB service reflecting transparent fact-driven community engagement and education

Equity & Environmental Justice

Target ZEB investment in communities where air pollution, racial, and socioeconomic disparities are greatest while also balancing the challenges of new technology

Fiscal Impact

Deploy ZEBs in a fiscally efficient manner in order to maximize use of vehicles and infrastructure

Fiscal Impact

Operate and invest within fiscal means by planning for and optimizing capital and operating expenditures while pursuing new funding streams

Zero-Emission Bus Technologies

Electric Trolleybus

Fuel Cell Electric Bus (FCEB)

Battery Electric Bus (BEB)

Fixed Route Battery Electric Bus (BEB)

BEBs selected as short-term ZEB propulsion technology for implementation and deployment

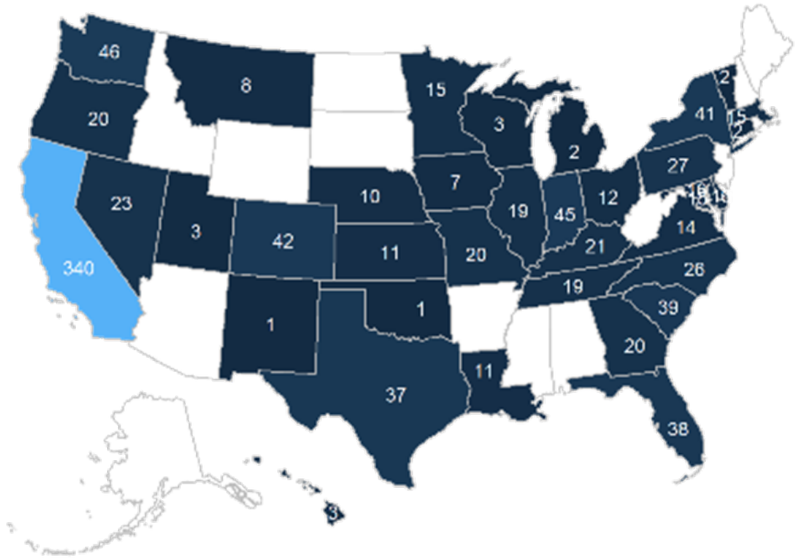
Advantages

- Less expensive than Fuel Cell Electric Buses
- Charging infrastructure can be flexibly installed at a variety of locations either along a bus route or at a garage

Current Limitations

- Limited usable range (likely <150 miles on a single charge) influenced by battery capacities, challenging climates, and topographies
- Up to multi-hour charging times
- Major facility and operational changes often required

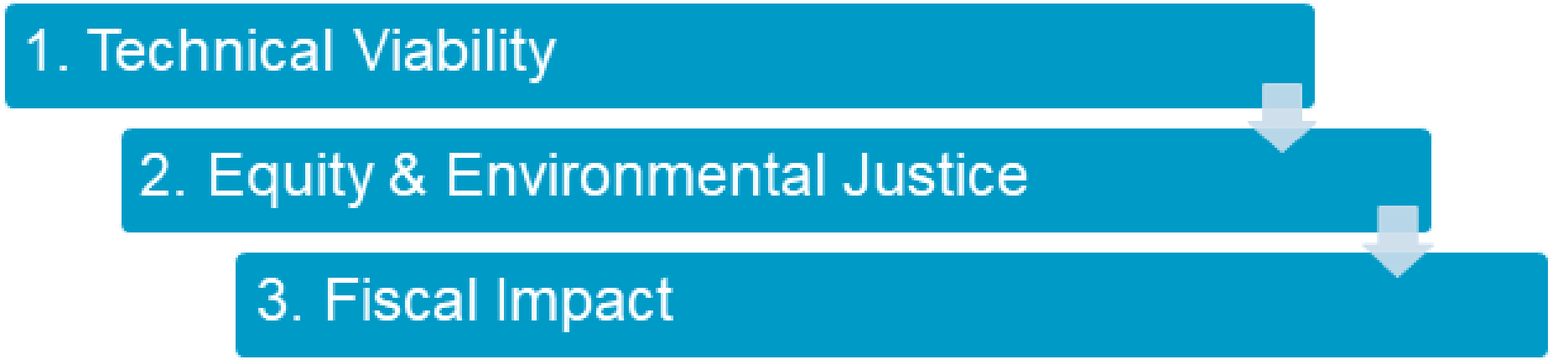
2021 NTD BEB Distribution (Active Fleet)



- Nearly 1,000 BEBs available to operate in revenue service across 37 states

Service Evaluation: Fixed Route

- Block-level BEB prioritization methodology



- Analysis used August 2022 service schedules

Findings: Fixed Route Service

Preliminary Results – Technical Viability

- 46% of all MTS & STP August 2022 blocks are technically viable
- Equity and Environmental Justice factors assigned priority levels
- Fiscal impact evaluation assures responsible investment of resources

Item	TOTAL	MTS	MVTA	SWT	Plymouth	Maple Grove
Number of Technically Viable Blocks	206	27	116	18	24	21
Number of Priority 1 Blocks	27	2	18	0	7	0
Number of Priority 2 Blocks	59	5	39	6	8	1
Publicly Owned Facilities		No	Yes	Yes	No	Yes*

Demand Response Battery Electric Vehicles

Nationwide Active Fleet Summary

Agency	Vehicle Type	# of Electric Vehicles
City of South Pasadena (South Pasadena, CA)	*Cutaway	1
L.A. Metro (Los Angeles, CA)	Van	15
City of Porterville (Porterville, CA)	Van	12
Antelope Valley Transit Authority (North Los Angeles Co, CA)	Van	8
San Diego Association of Governments (San Diego, CA)	Van	4
Jaunt, Inc. (Charlottesville, VA)	Van	1

* >40,000 reported to National Transit Database in 2021

Findings: Demand Response Service

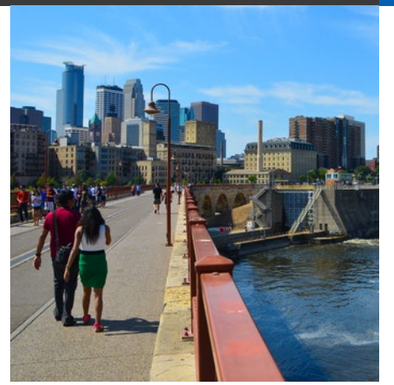
- Existing 60-mile bus range limits technical viability
- MTS would need to operate 2,354 electric vehicles to provide the existing level of Metro Mobility and Transit Link service.

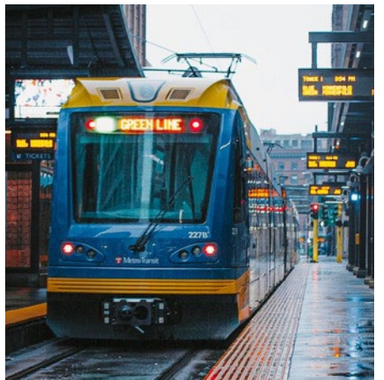
*Vehicle Type (Metro Mobility)	Current Fleet	Estimated Electric Fleet	Difference from Existing Fleet
Cutaway (20-29 Foot)	599	2,032	+1,433
SUVs	31	42	+11
Vans	0	-	-

Vehicle Type (Transit Link)	Current Fleet	Estimated Electric Fleet	Difference From Existing Fleet
Cutaway (20-29 Foot)	80	280	+200
SUVs	0	-	-
Vans	0	-	-

Contracted Service Challenges

- Contracts with service providers range from 3-6 years
- In order to electrify, the Council/Suburban Providers need to own garages or utilize long-term leases
- Operator shortages – no current ability to operate a larger fleet
- Production and supply chain constraints
- Speed of innovation
- Electrical grid capacity





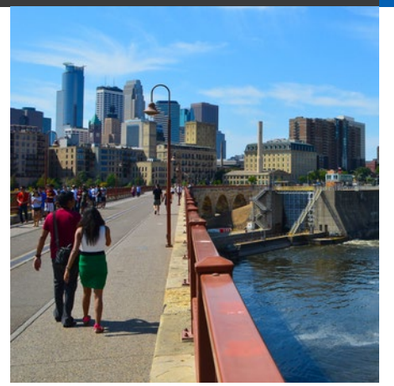
Near-term Opportunities

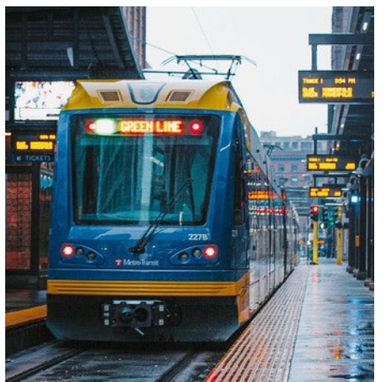
Fixed Route

- For Council service, fixed route should focus on Metro Transit.
- For other MTS Fleet, focus on suburban providers that own their facilities and where service is appropriate.
  - SWT to implement current grant-funded electrification.
  - MVTA to pursue discretionary grants to fund electrification.

Monitor evolution of small bus market electrification

- Current cutaway BEB technology does not support required vehicle range
- Demonstration efforts underway
- Five-year bus replacement cycle allows for short transition period.
- MTS conduct feasibility of garage ownership or long-term leasing to allow for public electrification investment.





Paul Colton

Fleet Manager
Metropolitan Transportation Serviced

METROPOLITAN
COUNCIL